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An updated checklist of the Italian Heleomyzidae (Diptera: Sphaeroceroidea)

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ABSTRACT. An updated critical Italian checklist of heleomyzid flies (Diptera: Heleomyzidae), based on recently reported and newly collected material from the Italian mainland, Sicily and Sardinia, is presented. Seven species are new for the Italian mainland; three genera and five species are new for Sardinia; three genera and six species are new for Sicily. Additional material of examined Heleomyzidae from various Italian areas is recorded. The type specimens of *Anorostoma romanum* CZERNY, 1924, described from Rome, were studied by the junior author and the species is synonymized with *Neoleria maritima* VILLENEUVE, 1921. A lectotype is designated for *A. romanum*.

Key words: entomology, zoogeography, Diptera, Heleomyzidae, Italy.

INTRODUCTION

The Heleomyzidae (Diptera, Brachycera, Sphaeroceroidea) is a small family of acalyptrate flies, currently subdivided into three subfamilies: Suilliinae (with the sole genus *Suillia* ROBINEAU-DESVOIDY, 1830 in the Palaearctic Region), Heteromyzinae (which includes a tribe with the genera *Heteromyza* FALLÉN, 1820, *Tephrochlamys* LOEW, 1862 and *Tephrochlaena* CZERNY, 1924 in the Palaearctic Region) and Heleomyzinae (three tribes and 12 genera in the Palaearctic Region) (GORODKOV 1984). One hundred and fifty-three species are recorded in Europe (WOŹNICA 2013) and approximately 600 worldwide.

It is difficult to make any general statements about the biology of Heleomyzidae, because they show a remarkable variety of habits (PAPP 1998). However, a clear distinction can be made between the Suillinae with mycetophagous larvae, and the other two subfamilies whose larvae are saprophagous, developing on decaying organic matter. Most species can be found in cool and shaded places, often in mammal burrows, bird's nests, caves, dung, on mushrooms and decaying animal and vegetable matter, but also on dried carrion.

Fundamental works on this family are the monograph published by CZERNY (1924) and for the Palaearctic Region the papers and revisions by COLLIN (1943), GORODKOV (1959, 1962, 1984), PAPP (1981), PAPP & CARLES-TOLRÁ (1994), PAPP & WOŹNICA (1993).

Italian studies of Heleomyzidae are scattered and out of date. Currently, the reference for an updated checklist of Italian Heleomyzidae is the Fauna Europea website www.faunaeur.org (WOŹNICA 2013), which reports 69 species and is based on faunistic papers by BEZZI (1891, 1892, 1895, 1897), FUNK & GRAFFE (1895), RONDANI (1867), WOŹNICA (2008) and LO GIUDICE & RIVISECCHI (2010). Most of the records presented in these papers refer to findings from northern Italy.

Four additional species, already reported for the Italian fauna but omitted in www.faunaeur.org, must be added to the checklist: *Suillia lurida* (MEIGEN, 1830), reported from Emilia-Romagna (RONDANI 1867 sub *Suillia agaricina*), *Suillia quadrilineata* CZERNY, 1924, reported from Trentino-Alto Adige by WOŹNICA (2008), *Gymnomus caesius* (MEIGEN, 1830), reported from Emilia-Romagna (RONDANI 1867 sub *Leria Caesia*), from Trentino-Alto Adige, Bolzano prov., Passo dello Stelvio (PAPP & WOŹNICA 1993: Austria, Tyrolis, Stilsfer Joch), Piedmont, Latium and Abruzzo (LO GIUDICE & RIVISECCHI 2010), and *Acantholeria cineraria* (LOEW, 1862), reported from Emilia-Romagna and Trentino-Alto Adige (RONDANI 1867 sub *Leria Chaetomera*, WOŹNICA 2008).

In this paper an updated checklist of Heleomyzidae of the Italian fauna is given. New faunistic records (Appendix I) and information regarding the European distribution and, if possible, the detailed Italian distribution of the species, are provided.

MATERIALS AND METHODS

All the information regarding the presence and distribution of the species was obtained from the following sources:

Material collected during the “CONECOFOR” project (see below);

Material collected during the “CANOPY” project (see below);

Other specimens specifically targeted in the field;

Faunistic papers by BEZZI (1891, 1892, 1895, 1897), FUNK & GRAFFE (1895), RONDANI (1867), WOŹNICA (2008) and LO GIUDICE & RIVISECCHI (2010);

The checklist of the Italian fauna (GORODKOV 1995);

The Catalogue of Palaearctic Diptera (GORODKOV 1984).

The CONECOFOR (CONtrollo ECOSistemi FORestali – Forest Ecosystem Control) project was carried out in nine Italian regions from 2003 to 2005. This project included

the InvertebrateBiodiv pilot project to test a standardized low-cost protocol for sampling invertebrates. All the investigated areas have a surface of 2500 m² and are situated in closed forest habitat (MASON ET AL. 2006). One Malaise, one windows trap and four pitfall traps were placed in each of the 12 CONECOFOR plots (Appendix II).

The CANOPY project was carried out at Bosco Fontana (coordinates 45°12, 04.9N, 10°44, 32.7E), a state-managed nature reserve of about 233 ha situated near Marmirolo, about 5 km NW of Mantua, Lombardy, NE Italy, at an altitude of 25 m. This study was carried out in 2008 using a total of 14 Malaise traps, seven on the ground (B) and seven in the tree canopy (A). The traps were positioned in forest sections classified as belonging to the association *Polygonato multiflori–Quercetum roboris* SARTORI 1980, the dominant vegetation type of Bosco Fontana (STIREMAN ET AL. 2012).

The material collected during these studies is preserved in 70% ethanol in the collection of the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Verona.

The species listed below are arranged following the Catalogue of Palaearctic Diptera (GORODKOV 1984).

ABBREVIATIONS USED IN THE TEXT

Collectors: AC: A. CONTER, AG: A. GIBERTONI, AGT: A. GATTO, CNBF: CNBF CORPO FORESTALE DELLO STATO, DB: D. BIRTELE, DG: D. GIBERTONI, DW: D. WITHMORE, EM: E. MINARI, FB: F. BONGIANNI, FDG: F. DI GIOVANNI, FI: F. IACCARINO, GC: G. CHESSA, GF: G. FORCINA, GLG: G. LO GIUDICE, GM: G. MALIZIA, GN: G. NARDI, LS: L. SPADA, MB: M. BARDIANI, MC: M. CONSALVO, MLP: M. LOPRESTI, MM: M. MINI, MR: M. ROMANO, MX: MAXENTI, MT: M. TISATO, MZ: M. MAZZA, PC: P. CERRETTI, PG: P. GRASSO, RM: R. MAURO, RR: R. ROMANIN, SB: SOBRINI, SH: S. HANDERSEN, SM: S. MINERBI, VN: VINCENTI.

Repositories: NHMW: Naturhistorische Museum, Wien, Austria.

Sampling methods: lbt: liver bait trap, mlt: Malaise trap, pt: pitfall trap, wt: windows trap.

Symbols: *: new for the relevant administrative region. ** new for Italy.

Abbreviations of measurements follow WOŹNICA (2003).

Label data of type specimens are given verbatim using the following symbols:

/ end of a line and beginning of the next;

// end of a label and beginning of the next (from top to bottom on the same pin).

RESULTS

UPDATED CHECKLIST OF THE ITALIAN FAUNA AND DISTRIBUTION

Orbellia myiopiiformis ROBINEAU-DESVOIDY, 1830

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Latium, Abruzzo*.

Oldenbergiella seticerca PAPP, 1980

Distribution. West Palaearctic. **Europe:** Spain, Czech Republic, Hungary, Cyprus.
Italy: Abruzzo.

Oldenbergiella carcacifera PAPP, 1980

Distribution. West Palaearctic. **Europe:** Spain, Czech Republic, Slovakia, Hungary. **Italy:** Abruzzo*.

Oecothea fenestralis fenestralis (FALLÉN, 1820)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Emilia Romagna, Latium, Calabria.

*Oecothea praecox*** LOEW, 1862

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Veneto*, Sicily*.

Eccoptomera filata LOEW, 1862

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** This species was recorded both for North and South Italy, without more precise indication of locality, by GORODKOV (1995). Latium.

Eccoptomera inermis CZERNY, 1924

Distribution. West Palaearctic. **Europe:** Poland. **Italy:** Molise.

Eccoptomera infusata WAHLGREN, 1918

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Previously recorded for northern Italy without more precise indication of locality (GORODKOV 1995). Trentino-Alto Adige, Sicily.

Eccoptomera ligustica CANZONERI, RAMPINI & ROSSI, 1983

Distribution. West Palaearctic. **Europe:** Italy. **Italy:** Liguria. The species has been omitted in the previous Italian checklist (see: GORODKOV 1995).

*Eccoptomera longiseta*** LOEW, 1862

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Veneto*, Abruzzo*.

*Eccoptomera microps*** (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Calabria*.

Eccoptomera obscura (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Previously recorded from northern Italy without other indication of locality (Gorodkov 1995). Piedmont, Trentino-Alto Adige, Latium, Calabria*, Sicily*.

Eccoptomera ornata LOEW, 1862

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Eccoptomera sanmartini CZERNY, 1924

Distribution. West Palaearctic. **Europe:** Spain, France. **Italy:** Trentino-Alto Adige.

Neoleria flavicornis (LOEW, 1862)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Tuscany, Marches, Latium.

Neoleria fuscicornis CZERNY, 1924

Distribution. West Palaearctic. **Europe:** Austria, Poland. **Italy:** Piedmont ? (see Remarks).

Remarks. Described based on one female from Mount Cenis, but it is uncertain whether on the Italian or French side (see GORODKOV 1984). Hitherto, two males only have been found; one from Austria (MARTINEK 1985) and one from Poland (WOŹNICA 2004).

Neoleria inscripta (MEIGEN, 1830)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Neoleria maritima VILLENEUVE, 1921

Anorostoma romanum CZERNY, 1924, **syn. nov.**

Distribution. West Palaearctic. **Europe:** Ireland, Britain I., French, Spain, Belgium, Malta. Recently recorded from the Netherlands and Portugal (WOŹNICA & ANDRADE, 2008). **Italy:** Latium (Rome) (CZERNY 1924).

Remarks.*Anorostoma romanum* CZERNY, 1924

The junior author studied the two syntypes and found that both specimens are conspecific with *Neoleria maritima* VILLENEUVE. The male specimen is hereby designated as the lectotype.

TYPE MATERIAL: Lectotype, male: *Anorostoma / romanum* / ♂ Czerny / det. Czerny // Rom XI / 46538 (NHMW).

MEASUREMENTS

Body length: 3.3mm. Wing length: 3.6 mm mm. Wing width: 1.3mm. Mv ratio: 1.50; head ratio: 1.28; cheek-eye ratio: 0.76; flag ratio: 1.25; flag-cheek ratio: 0.47.

Remarks on the lectotype: right wing and right mid leg missing. Hind femora distinctly thickened.

Paralectotype, female *Anorostoma / romanum* / ♀ Czerny / det. Czerny // Rom XI / 46538 (NHMW).

Measurements

Body length: 3.3mm. Head ratio: 1.27; cheek-eye ratio: 0.87; flag ratio: 1.17; flag-cheek ratio: 0.46.

Remarks on the paralectotype: both wings destroyed, right arista missing.

Neoleria propinqua COLLIN, 1943

Distribution. West Palaearctic. **Europe:** Britain I. Recently recorded from Germany (BAUMJOHANN & RUDZINSKI 2012). **Italy:** Sicily*.

Neoleria ruficauda (ZETTERSTEDT, 1847)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Abruzzo.

Neoleria ruficeps (ZETTERSTEDT, 1838)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Sardinia*.

Acantholeria cineraria (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino, Emilia Romagna.

Acantholeria dentitibia (OLDENBERG, 1916)

Distribution. Palaearctic. **Europe:** Cyprus. **Italy:** Trentino Alto-Adige.

Acantholeria vockerothi HACKMAN, 1969

Distribution. West Palaearctic. **Europe:** Spain. **Italy:** Liguria, Abruzzo*.

Schroederella iners (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Recorded from North Italy without further indication of locality (GORODKOV 1995).

Morpholeria (Morpholeria) dudai (CZERNY, 1924)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Sardinia*.

*Morpholeria (Spanoparea) limbinervis*** (CZERNY, 1909)

Distribution. West Palaearctic. **Europe:** Spain. **Italy:** Abruzzo*.

Remarks. The shape of gonostylus (= distystylus auct.) (WOŹNICA 2004) is similar to an inverted U in lateral view.

Morpholeria (Spanoparea) ruficornis (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Abruzzo*.

Morpholeria (Spanoparea) variabilis (LOEW, 1862)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Scoliocentra (Chaetomus) confusa (WAHLGREN, 1918)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Scoliocentra (Chaetomus) flavotestacea (ZETTERSTEDT, 1838)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Previously recorded from northern Italy without further indication of locality (GORODKOV 1995). Trentino-Alto Adige*.

Gymnomus amplicornis (CZERNY, 1924)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Marches, Latium.

Gymnomus caesius (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Piedmont, Trentino-Alto Adige, Emilia Romagna, Latium, Abruzzo, Sardinia*.

Gymnomus ceianui (MARTINEK, 1985)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Veneto*.

Gymnomus mariei (SEGUY, 1934)

Distribution. West Palaearctic. **Europe:** France, Switzerland. **Italy:** Piedmont, Trentino-Alto Adige.

Gymnomus sabroskyi (GILL, 1962)

Distribution. Holarctic. **Europe:** Sweden, Poland, Czech Republic, Slovakia. **Italy:** Trentino-Alto Adige.

Gymnomus spectabilis (LOEW, 1862)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Latium.

Heleomyza (Heleomyza) captiosa (GORODKOV, 1962)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Piedmont, Lombardy, Liguria, Latium, Abruzzo, Sicily.

Heleomyza (Heleomyza) modesta (MEIGEN, 1835)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Piedmont, Lombardy, Trentino-Alto Adige, Veneto, Emilia Romagna, Umbria, Abruzzo.

*Heleomyza (Heleomyza) serrata*** (LINNAEUS 1758)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Abruzzo*.

Suillia affinis (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Friuli-Venezia Giulia, Veneto*, Emilia Romagna, Tuscany*, Umbria*, Abruzzo*, Calabria*, Apulia*.

Suillia atricornis (MEIGEN, 1830)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Friuli-Venezia Giulia*, Emilia-Romagna, Abruzzo*.

Suillia bicolor (ZETTERSTEDT, 1838)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy*, Trentino-Alto Adige, Veneto*, Abruzzo*, Calabria*, Sardegna*.

Suillia bistrigata (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** Portugal, Spain, France, Corsica, Croatia, European Turkey, Crete. **Italy:** Liguria, Calabria*, Sardinia.

Suillia crinimana (CZERNY, 1904)

Distribution. West Palaearctic. **Europe:** Switzerland, Austria, Poland, Slovakia, Romania, Bulgaria. **Italy:** Trentino-Alto Adige.

Suillia femoralis (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread in Central Europe. **Italy:** Recorded from northern and southern Italy without further indication of locality (GORODKOV 1995).

Suillia flagripes (CZERNY, 1904)

Distribution. West Palaearctic. **Europe:** Portugal, Spain, France, Switzerland, Corsica. **Italy:** Previously recorded from northern and southern Italy without further indication of locality (GORODKOV 1995). Tuscany*, Sardinia*.

Suillia flava (MEIGEN, 1830)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna, Tuscany, Campania.

Suillia flavifrons (ZETTERSTEDT, 1838)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy*, Trentino-Alto Adige.

Suillia flavitarsis (RONDANI, 1867)

Distribution. West Palaearctic. **Europe:** Corsica. **Italy:** Emilia-Romagna.

Suillia fuscicornis (ZETTERSTEDT, 1847)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy*, Trentino-Alto Adige, Abruzzo*, Calabria*.

Suillia gigantea (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Tuscany*, Umbria*, Calabria, Sicilia*.

Suillia humilis (MEIGEN, 1830) = *inornata* LOEW 1862

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Lombardy*, Tuscany*, Abruzzo*, Calabria.

Suillia laevifrons (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Tuscany*, Calabria*, Sicily*.

Suillia lineitergum (PANDELLE, 1901)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Suillia lurida (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Emilia-Romagna, Abruzzo*.

Suillia mikii (POKORNY, 1886)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Suillia nemorum (MEIGEN, 1830)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Lombardy*, Trentino-Alto Adige, Emilia-Romagna, Calabria*.

Suillia notata (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Veneto*, Tuscany*, Abruzzo*, Calabria*, Sicilia*, Sardegna.

Suillia oldenbergii (CZERNY, 1904)

Distribution. Palaearctic. **Europe:** Germany, Poland, Czech Republic, Slovakia, Romania. **Italy:** Trentino-Alto Adige.

Suillia oxyphora (MIK, 1900)

Distribution. West Palaearctic. **Europe:** widespread in Central Europe. **Italy:** Previously recorded from northern Italy without further indication of locality (GORODKOV 1995). Abruzzo*.

Suillia pallida (FALLÉN, 1820)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Emilia-Romagna, Umbria*, Abruzzo*.

Suillia parva (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Calabria*.

Suillia pilimana (LOEW, 1862)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Emilia-Romagna, Abruzzo*, Calabria*.

Suillia quadrilineata CZERNY, 1924

Distribution. Palaearctic. **Europe:** widespread in Central and northern Europe. **Italy:** Trentino-Alto Adige.

Suillia setitarsis (CZERNY, 1904)

Distribution. West Palaearctic. **Europe:** France. **Italy:** Recorded from southern Italy without further indication of locality (GORODKOV 1995).

Suillia tuberiperda (RONDANI, 1867)

Distribution. West Palaearctic. **Europe:** Spain, France, Switzerland, Croatia, Serbia and Montenegro, Bulgaria. **Italy:** Tuscany, Veneto.

Suillia umbratica (MEIGEN, 1835)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Abruzzo*.

Suillia univittata (VON ROSER, 1840)

Distribution. West Palaearctic. **Europe:** widespread in Central Europe. **Italy:** Previously recorded from Italy without further indication of locality (WOŹNICA 2013). Abruzzo*.

Suillia ustulata (MEIGEN, 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Friuli-Venezia Giulia, Emilia-Romagna, Calabria.

Suillia vaginata (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Suillia variegata (LOEW, 1862)

Distribution. Palaearctic. **Europe:** widespread. **Italy:** Piemonte, Trentino-Alto Adige, Veneto*, Friuli-Venezia Giulia, Emilia-Romagna, Tuscany, Latium*, Abruzzo*, Calabria, Sicily, Sardinia.

Suillia villeneuvei CZERNY, 1924

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Heteromyza atricornis MEIGEN, 1830

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy, Trentino-Alto Adige, Friuli-Venezia Giulia, Abruzzo.

Heteromyza commixta COLLIN, 1901

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Recorded from North Italy without further indication of locality (GORODKOV 1984).

Heteromyza oculata FALLÉN, 1820

Distribution. Holarctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige.

Tephrochlamys flavipes (ZETTERSTEDT, 1838)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Lombardy*, Trentino-Alto Adige, Veneto*, Friuli-Venezia Giulia*, Emilia-Romagna, Tuscany*, Latium*, Abruzzo, Calabria*, Sardinia*.

*Tephrochlamys laeta*** (MEIGEN 1830)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Veneto*.

Tephrochlamys rufiventris (MEIGEN, 1830)

Distribution. Holarctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Veneto*, Friuli-Venezia Giulia, Emilia-Romagna*, Umbria, Latium, Abruzzo, Calabria, Sicily.

Tephrochlamys tarsalis (ZETTERSTEDT, 1847)

Distribution. West Palaearctic. **Europe:** widespread. **Italy:** Trentino-Alto Adige, Veneto*, Emilia-Romagna, Latium.

CONCLUSIONS

Among the 80 listed species, seven are new for the Italian mainland: *Eccomptomera microps* (MEIGEN, 1830), *Eccomptomera longiseta* Loew, 1862, *Oecothea praecox* LOEW, 1862, *Tephrochlamys laeta* (MEIGEN, 1830), *Heleomyza serrata* (LINNAEUS, 1758), *Morpholeria (Spanoparea) limbinervis* (CZERNY, 1909) and *Oldenbergiella calcacifera* PAPP, 1980. Three genera (*Neoleria* MALLOCH, 1919, *Morpholeria* GARRETT, 1921 and *Gymnomus* LOEW, 1863) and five species (*Suillia flagripes* (CZERNY, 1904), *Morpholeria dudai* (CZERNY, 1924), *Neoleria ruficeps* (ZETTERSTEDT 1838), *Tephrochlamys flavipes* (ZETTERSTEDT, 1838) and *Gymnomus caesius* (MEIGEN, 1830)) are new for Sardinia. Three genera (*Eccomptomera* LOEW, 1862, *Neoleria* MALLOCH, 1919 and *Oecothea* HALIDAY IN

CURTIS, 1837) and six species (*Suillia gigantea* (MEIGEN, 1830), *Suillia laevifrons* (Loew, 1862), *Suillia notata* (MEIGEN, 1830), *Eccomptomera obscura* (MEIGEN, 1830), *Neoleria propinqua* COLLIN, 1943, and *Oecothoa praecox* LOEW, 1862) are new for Sicily.

One species, *Neoleria propinqua* COLLIN, 1943, is new for the Italian fauna (here recorded from Sicily but not from the mainland). *Neoleria ruficeps* (ZETTERSTEDT, 1838) is new for the Italian fauna (here recorded from Sardinia but not from the mainland).

These faunistic records allowed us to extend the distribution of several species in the central and southern Italy. The number of species of Heleomyzidae known for the Italian fauna rises to 80.

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APPENDIX I (new faunistic data)

Oldenbergiella calcacifera

Records. **Abruzzo**, L'Aquila prov., Tagliacozzo, Marsia, faggeta, 30.X–6.XI.2010, 71♂♂, 179♀♀, lbt, GLG.

Orbellia myopiformis

Records. **Abruzzo**, L'Aquila prov., Tagliacozzo, Marsia, faggeta, 7–14.XI.2010, 29♂♂, 23♀♀; 14.XI–8.XI.2010, 28♂♂, 11♀♀, lbt, GLG.

Oecothea praecox

Records. **Canopy-A**: 13–27.V.2008, 1♂, mlt, MB, DB, AG; **Canopy-B**: 27.V–10.VI.2008, 1♂, mlt, MB, DB; **Sic 1**: 1.V–30.VI.2005, 3♂♂, 2♀♀, mlt, AGT.

Eccoptomera microps

Records. **Cal 1.**, 5.XI–18.XI. 03, 1♀, DB, PC, MT.

Eccomptomera obscura

Records. **Cal 1.**, 5.XI–18.XI. 03, 1♀, DB, PC, MT ; **Sic 1**: 1–30.XI.2004, 1♂, mlt, AGT.

Eccomptomera longiseta

Records. **Canopy-A**: 29.IV–13.V.2008, 1♂, mlt, MB, DB, AG; **Abr 1**: 29.VI–20.VII.2004, 1♂, mlt, MR; 7–21.VI.2005, 1♂, mlt, MR.

Neoleria ruficeps

Records. **Sar 1**: 17.X–3.XI.2005, 1♀, mlt, GC; 3–16.XI.2005, 1♂♂, mlt, GC; 16.XI–2.XII.2005, 6♀♀, mlt, GC.

Neoleria propinqua

Records. **Sic 1**, 1–30.XI 2005, 8♂♂, 3♀♀, AGT; 1–31.XII.2005, 2♂♂, 4♀♀, mlt, AGT;

Acantholeria vockerothi

Records. **Abruzzo**, L'Aquila prov., Sante Marie, Santo Stefano, 42°6'34.85"N 13°13'59.43"E, 5.VI.2011, 5♂♂, 4♀♀, GLG.

Morpholeria (Morpholeria) dudai

Records. **Sar-C85**, 11–12.VI.2004, 2♂♂, 2♀♀, mlt, DB, PC, GN, MT, DW.

Morpholeria limbinervis

Records. **Abr 1**, 20.VII.2003–03.VIII. 2004, 1♂, MR legit.

Morpholeria (Spanoparea) ruficornis

Records. **Abr 1**: 20.VII–3.VIII.2004, 2♂♂, 2♀♀, mlt, MR; 14–28.IX.2004, 1♀, mlt, MR, MC; 29.IX–13.X.2004, 1♂♂, 4♀♀, mlt, MR, MC; 2–9.XI.2004, 2♂♂, 2♀♀, mlt, MR, MC; 27.VII–10.VIII.2005, 1♀, mlt, MR.

Scoliocentra (Chaetomus) flavotestacea

Records. **Tre 1**: 24.VIII–7.IX.2004, 1♂, mlt, AC.

Gymnomus caesius

Records. **Sar-C85**, 11–12.VI.2004, 1♂, mlt, DB, PC, GN, MT, DW.

Gymnomus ceianui

Records. **Canopy-A**, 1–15.IV.2008, 1♂, mlt, MB, DB, AG.; **Canopy-A**: 15–29.IV.2008, 2♂, mlt, MB, DB, AG; **Canopy-A**: 11–25.XI.2008, 1♂, mlt, AG, SH, LS.

Heleomyza (Heleomyza) serrata

Records. **Abruzzo**, L'Aquila prov., Tagliacozzo, Marsia, faggeta, 8.XII.2010–16.I.2011, 1♂, lbt, GLG.

Suillia affinis

Records. **Canopy-B**: 28.X–11.XI.2008, 1♂, mlt, MB, AG, LS; **Tos 1**: 5–19.IV.2005, 1♂, 1♀, pt, FI, FB; 31.V–15.VI.2005, 2♂♂, 3♀♀, mlt, FI, FB; 15–29.VI.2005, 4♂♂, pt, FB; 29.VI–13.VII.2005, 1♂, pt, FI, FB; 10–24.VIII.2005, 2♂♂, 3♀♀, mlt, FI, FB; 8–22.II.2006, 1♂, pt, FB; 22.II.2006, 4♂♂, pt, FI, FB; **Umbria**, Perugia prov., Norcia, Forsivo, 1050 m, 1.VI.2008, 6♂♂, pt, GLG; **Abr 2**: 15–30.VII.2005, 2♂♂, 12♀♀, pt, MR; 30.VII.2005, 3♂♂, 5♀♀, mlt, MR; 15–30.VII.2005, 1♂, wt, MR; **Cal 1**: 26–31.VII.2003, 24♂♂, 4♀♀, pt, DB, PC, MT; **Puglia**: Foggia prov., Biccari, Vado del Tufo, 800–900 m, 12–19.VIII.2009, 8♂♂, pt, FDG.

Suillia atricornis

Records. **Fri 2**: 7–21.IX.2004, 3♂♂, 2♀♀, mlt, GM, RR; **Lom 1**: 6–20.IX.2004, 1♂, 1♀, mlt, MX, SB; 20.IX–4.X.2004, 7♂♂, 6♀♀, mlt, PG, RM; 16–29.VIII.2005, 1♂, mlt, MX; **Abr 2**: 27.VII.2003, 1♂, mlt, DB, PC.

Suillia bicolor

Records. **Canopy-B**: 28.X–11.XI.2008, 1 m, mlt, MB, AG, LS; **Lom 1**: 20.IX–4.X.2004, 1♂, 2♀♀, mlt, PG, RM; **Tre 1**: 13–27.VII.2004, 1♂, mlt, AC; **Abr 1**: 7–21.VI.2005, 1♂, mlt, MR; **Abr 2**: 27.VII.2003, 2♂♂, mlt, DB, PC; 15–30.VII.2005, 1♂, mlt; 30.VII–5.VIII.2005, 1♂, 1♀, wt, MR; **Cal 1**: 12–26.X.2004, 3♂♂, 13♀♀, PG, RM; 23.VI–2.VIII.2007, 8 m, 3 f, mlt, CNBF; **Sar-C85**: 11–12.VI.2004, 1♂, mlt, DB, PC, GN, MT, DW.

Suillia bistrigata

Records. **Cal 1**: 26–31.VII.2003, 2♂♂, pt, DB, PC, MT; 2–26.VIII.2003, 1♂, mlt, DB, PC, MT; 23.VI–2.VIII.2007, 2♀♀, mlt, CNBF; **Sar 1**: 6.VII–1.VIII.2004, 1♂, pt, GC; **Sar-C85**, 11–12.VI.2004, 1♂; 11–12.VI.2004, 6♂♂, 6♀♀, mlt, DB, PC, GN, MT, DW.

Suillia oxyphora

Records. **Abr 1**: 20.VII–3.VIII.2004, 1♂, mlt, MR; **Abruzzo**, L'Aquila prov., R.N.O. Monte Velino, Loc. Valle di Teve, 1515 m, beech forest, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 11♂♂, 1♀, GLG, MM.

Suillia flagripes

Records. **Sar 1**, 14.VII–5.VIII.2005, 14♂♂, 6♀♀, pt, GC; 16.XII.2006–3.I.2007, 5♂♂ 2♀♀, pt, GC; 2 ♂♂, 6.X–5.XI.2004, GC; **Tos 1**, 26.VII–10.VIII.2005, 1♂, pt, FB.

Suillia flavifrons

Records. **Lom 1**: 16–29.VIII.2005, 4♂♂, 1♀, pt, MX; **Tre 1**: 10–24.VIII.2004, 1♂, mlt, AC.

Suillia fuscicornis

Records. **Lom 1**: 20.IX–4.X.2004, 3♂♂, 10♀♀, mlt, PG, RM; 16–29.VIII.2005, 2♂♂, pt, MX; **Tre 1**: 24.VII–7.IX. 2004, 1♂, mlt, AC; 27.VII–10.VIII.2004, 1♂, 1♀, mlt, AC; **Abr 2**: 10–23. IX.2003, 1♂, mlt, DB, PC; **Cal 1**: 26–31.VII.2003, 1♂, pt, DB, PC, MT; 19.XI–2.XII.2003, 1♂, mlt, DB, PC, MT.

Suillia gigantea

Records. **Tos 1**: 29.VI–13.VII.2005, 1♂, pt, FI, FB; 26.VII–10.VIII.2005, 2♂♂, pt, FB; **Umbria**, Perugia prov., Norcia, Forsivo, 1050 m, 28.VIII–3.IX.2009, 6♂♂, pt, GLG; **Cal 1**: 26–31.VII.2003, 1♂, pt, DB, PC, MT; **Sic 1**: 1.IX–31.X.2004, 1♂, pt, AGT.

Suillia humilis

Records. **Lom 1**: 18.VII–1.VIII.2005, 1♂, 1♀, mlt, MX, SB; **Tos 2**: 24.I–9.II.2006, 1♂, mlt, MZ; **Abr 2**: 27.VII–9.IX.2003, 1♂, 2♀, mlt, DB, PC; **Abruzzo**, L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 1♂, pt, GLG, MM; **Cal 1**: 23.VI–2.VIII.2007, 1♂, mlt, CNBF.

Suillia lurida

Records. **Abruzzo**, L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 3♂♂, pt, GLG, MM.

Suillia laevifrons

Records. **Tre 1**: 17–27.VII.2004, 1♂, mlt, AC; 24.VIII–7.IX.2004, 1♂, mlt, AC; **Tos 1**: 1 f, 8–22.II.2006, 1♂, pt, FB; **Cal 1**: 26–31.VII.2003, 33♂♂, pt, DB, PC, MT; 2–26.VIII.2003, 3♂♂, 3♀♀, mlt, DB, PC, MT; 27.VIII–9.IX.2003, 1♂, 1♀, mlt, DB, PC, MT; 10–22.XI.2003, 1♂, 4♀♀, pt, DB, PC, MT; 23.VI–2.VIII.2007, 10♂♂, 5♀♀, mlt, CNBF; **Sic 1**: 1.VII–31.VIII. 2004, mlt, 1♂, 2♀♀, AGT; 1.IX–31.X. 2004, 19♂♂, 24♀♀, pt, AGT; 1–30.IX.2004, 12♂♂, 16♀♀, mlt, AGT; 1.III–30.IV. 2005, 3♂♂, 9♀♀, wt, AGT; 1.V–30.VI.2005, 1♂, 1♀, mlt, AGT; 1–28.II.2005, 33♂♂, 16♀♀, mlt, AGT.

Suillia nemorum

Records. **Lom 1**: 16–29.VIII.2005, 2♂♂, pt, MX; **Tre 1**: 10–24.VIII.2004, 1♂, mlt, AC; **Cal 1**: 26–31.VII.2003, 1♂, pt, DB, PC, MT.

Suillia notata

Records. **Canopy-B**: 11–25.XI.2008, 1♂, MB, DG, LS; **Tos 1**: 19–31.V.2005, 4♂♂, mlt, FI, FB; 4–17.X.2005, 2♂♂, pt, FI, FB; **Tos 2**: 19.IV–5.V.2005, 1♂, 1♀, mlt, MZ; 27.XII.2005–10.I.2006, 2♂♂, 1♀, pt, MZ, VN; **Abr 1**: 7–21.VI.2005, 1♀, mlt, MR; 25.VII–7.IX.2005, 16♂♂, 5♀♀, pt, MR; **Abr 2**: 1–15.VI.2005, 2♂♂, 2♀♀, mlt, MR; **Abruzzo**, L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 3♂♂, pt, GLG, MM; **Cal 1**: 26–31.VII.2003, 2♂♂, 2♀♀, pt, DB, PC, MT; 12–26.X.2004, 1♂♂, 1♀, mlt, PG, RM; **Cal 1**: 30.VIII–13.IX.2005, 1♂, mlt, PG, MR; **Sic 1**: 1–30.XI. 2004, 2♂♂, mlt, AGT; 1.XI–31.XII.2004, 2♂♂, pt, AGT; 1–28.II.2005, 5♂♂, 1♀, mlt, AGT; **Sar 1**: 6.X–5.XI.2004, 5♂♂, pt, GC; 5.VIII–13.IX.2005, 8♂♂, 7♀♀, pt, GC; 30.IX–17.X.2005, 9♂♂, 26♀♀, mlt, GC; 3–16.XI.2005, 13♂♂, 3♀♀, pt, GC; 16.XI–2.XII.2005, 1♂, pt, GC.

Suillia parva

Records. **Cal 1**: 26–31.VII.2003, 1♂, pt, DB, PC, MT.

Suillia pilimana

Records. **Lom 1**: 18.VII–1.VIII.2005, 1♂, 1♀, mlt, MX, SB; 16–29.VIII.2005, 9♂♂, 2♀♀, pt, MX, SB; **Abruzzo**, L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 1♂, pt, GLG, MM; **Cal 1**: 26–31.VII.2003, 1♂, pt, DB, PC, MT; 23.VI–2.VIII.2007, 1♂, mlt, CNBF.

Suillia setitarsis

Records. **Laz 2**: 1–16.04.2004, 2♂♂, 3♀♀, mlt, GF; **Sic 1**: IX–X.2004, 6♂♂, 1♀, pt, AGT.

Suillia umbratica

Records. **Abr 2**: 1–21.VI.2005, 1♂, 3♀♀, mlt, MR; **Abruzzo**: L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 15♂♂, 3♀♀, pt, GLG, MM.

Suillia pallida

Records. **Umbria**: Perugia prov., Norcia, Forsivo, 1050 m, 7.III–11.IV.2009, 2♂♂, 3♀♀, pt, GLG; **Abr 1**: 25.VIII–7.IX.2005, 1♂, pt, MR; **Abruzzo**: L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 32♂♂, pt, GLG, MM.

Suillia univittata

Records. **Abruzzo**, L'Aquila prov., RNO Monte Velino, Loc. Valle di Teve, 1515 m, faggeta, UTM 33 T 365134 4670306, 17.IX–10.X.2008, 1♂, pt, GLG, MM.

Suillia variegata

Records. **Canopy-A**: 13.–27.V.2008 1♂, 1♀, mlt, MB, DB, AG; **Tre 1**: 27.VII–10.VIII.2004, 1♀, mlt, AC; **Tos 1**: 17.III–5.IV.2005, 2♀♀, pt, FB; 17.III–5.IV.2005, 7♀♀, mlt, FI, FB; 18–31.V.2005, 1♀♀, mlt, FI, FB; 18.V.2005–11.I.2006, 2♂♂, 2♀♀, pt, FI, FB; 4–17.X.2005, 4♂♂, 2♀♀, pt, FI, FB; 28.XII.2005–11.I.2006, 1♀, pt, FB; 8–22.II.2006, 1♂, pt, FB; 22.II–8.III.2006, 2♂♂, 1♀, pt, FI, FB; 31.V–15.VI.2006, 1♀, mlt, FI, FB; **Tos 2**: 20.III–5.IV.2005, 4♂♂, 4♀♀, mlt, MZ; 20.III–5.IV.2005, 1♀, pt, MZ; 19.IV–5.V.2005, 4♂♂, 2♀♀, mlt, MZ; 12–28.XI.2005, 1♀, pt, MZ; 27.XI.2005–10.I.2006, 3♂♂, mlt, MZ, VN; 10–24.I.2006, 3♂♂, 8♀♀, mlt, MZ, VN; 24.I–9.II.2006, 1♂♂, 3♀♀, mlt, MZ; 9–17.II.2006, 2♀♀, mlt, MZ; **Laz 2**: 15.XI–6.XII.2004, 21♂♂, 7♀♀, pt, GF; **Abr 1**: 25.VIII–7.IX.2005, 1♀, pt, MR; **Abr 2**: 27.VIII–9.IX.2003, 1♀, mlt, DB, PC; 3–15.VIII.2004, 1♀, mlt, MR; 17–23.V.2005, 2♂♂, 2♀♀, mlt, DB, MB, D. DW; 1.V–30.VI.2005, 3♂♂, 2♀♀, pt, MR; 15–30.VIII.2005, 2♂♂, mlt, MR; **Cal 1**: 26–31.VII.2003, 3♂♂, 9♀♀, pt, DB, PC, MT; 2–26.VIII.2003, 1♂, 3♀♀, mlt, DB, PC, MT; 22.X–4.XI.2003, 1♀, mlt, DB, PC, MT; 5–18.XI.2003, 1♂, mlt, DB, PC, MT; 10–22.XI.2003, 3♀♀, pt, DB, PC, MT; 8–22.VI.2004, 1♂, 1♀, mlt, PG, RM; 31.VIII–14.IX.2004, 1♂, 1♀, mlt, PG, MR; 9–23.XI.2004, 1♂, mlt, PG, MR; **Sic 1**: 1–31.VII.2004, 2♂♂, mlt, AGT; 1.VII–31.VIII.2004, 1♂, mlt, AGT; 1–30.IX.2004, 10♂♂, 11♀♀, mlt, AGT; 1.IX–31.X.2004, 4♂♂, 2♀♀, pt, AGT; 1–31.XII.2004, 10♂♂, 2♀♀, mlt, AGT; 1.XI–31.XII.2004, 1♂, 1♀, pt, AGT; 1.III–30.IV.2005, 1♀, wt, AGT; 1.III–30.IV.2005, 15♂♂, 8♀♀, mlt, AGT; 1.IV–1.VIII.2005, 2♂♂, pt, DB, PC, MLP, D. DW; 1–31.VIII.2005, 5♂♂, 4♀♀, mlt, AGT; 1–30.IX.2005, 2♂♂, 6♀♀, mlt, AGT; **Sardinia**: Cagliari prov., Iglesias Marganai, 540 m, nr. Foeniculum vulgare, 5.IX.2003, 1♂, 1♀, DB, PC, EM, MT, DW; ; **Sar 1**: 16.VIII–8.IX.2004, 6♂♂, 8♀♀, pt, GC; 6.X–5.XI.2004, 10♂♂, 11♀♀, pt, GC; 5.VIII–13.IX.2005, 1♂, 3♀♀, pt, GC; 5.VIII–13.IX.2005, 5♂♂, 12♀♀, mlt, GC; 16.XII.2005–3.I.2006, 4♂♂, 5♀♀, pt, GC.

Tephrochlamys flavipes

Records. **Canopy-A**: 15–29.IV.2008, 1♀, MB, DB, AG; **Lom 1**: 6–20.IX.2004, 3♀♀, mlt, MX, SB; 20.IX–4.X.2004, 5♀♀, mlt, PG, RM; 16–29.VIII.2005, 1♂, 1♀♀, pt, MX; 16–29.VIII.2005, 11♀♀, mlt, MX; **Tre 1**: 27.VII–10.VIII.2004, 4♀♀, mlt, AC; 24.VII–7.IX.2004, 3♀♀, mlt, AC; 10–24.VIII.2004, 3♀♀, mlt, AC; **Fri 2**, 7–21.IX.2004, 11♀♀, mlt, GM, RR; **Tos 1**: 20.VIII.2004–17.III.2005, 1♂, 4♀♀, mlt, FB; 28.XII.2005–11.I.2006, 1♀, pt, FB; 8–22.II.2006, 1♀, pt, FB; **Tos 2**: 10–24.I.2006, 1♀, mlt, MZ, VN; **Abr 1**: 27.VI–10.VIII.2005, 1♂, mlt, MR; **Cal 1**: 22.X–4.XI.2003, 3♀♀, mlt, DB, PC, MT; 21.XII.2004–4.I.2005, 1♀, mlt, PG, MR; **Sar 1**: 16.XI–2.XII.2005, 1♀, pt, GC.

Tephrochlamys laeta

Records. **Canopy-A**: 1–15.IV.2008, 1♂, mlt, MB, DB, AG.

Tephrochlamys rufiventris

Records. **Canopy-A**: 1–15.IV.2008, 1♂, 2♀♀, mlt, MB, DB, AG; **Bol 1**: 1♀, mlt, SM; **Abr 1**: 20.VI–3.VIII.2004, 4♂♂, 2♀♀, mlt, MR; 27.VI–10.VIII.2005, 1♂, mlt,

MR; 29.V–20.VII.2004, 1♂, mlt, MR; **Abr 2**: 27.VII–9.IX.2003, 1♀, mlt, DB, PC; 1–15.VI.2005, 1♂, mlt, MR; **Cal 1**: 23.VI–2.VIII.2007, 2♀♀, mlt, CNBF; **Sar-C85**, 11–12.VI.2004, 60♂♂, 42♀♀, mlt, DB, PC, GN, MT, DW.

Tephroclamyis tarsalis

Records. **Canopy-A**: 1–15.IV.2008, 1♂, 1♀, mlt, MB, DB, AG; **Canopy-A**: 29.IV–13.V.2008, 1♂, mlt, MB, DB, AG; **Canopy-A**: 11–25.XI.2008, 1♀, mlt, AG, SH, LS; **Canopy-B**: 28.X–11.XI.2008, 4♀♀, mlt, MB, DG, LS; **Canopy-B**: 11–25.XI.2008, 3♀♀, mlt, AG, LS.

APPENDIX II

Environmental features of the 12 Areas of Sampling (MOSELLO et al. 2002):

Lom 1. Region: Lombardy; Province: Sondrio; Locality: Val Masino, Bagni di Masino; UTM coordinates: UTM 32 T 93316 461416; Altitude (m): 1190 m; Slope and aspect: 20° NE; Precipitation (mm): 1300; Average yearly temperature (C°): 8; Biocoenosis: high forest – *Picea abies*; Vegetational association: *Veronico urticifoliae-Piceetum*; Bioclimatic zone: Medium-European; Altitudinal belt: sub-Atlantic;

Tre 1. Region: Trentino-Alto Adige; Province: Trento; Locality: Daiano, Passo Lavazè; UTM coordinates: UTM 32 T 691933 5137103; Altitude (m): 1775 m; Slope and aspect: 10° NNW; Precipitation (mm): 800; Average yearly temperature (C°): 5; Biocoenosis: *Picea abies*; Vegetational association: *Homogyno-Piceetum*; Bioclimatic zone: Medium-European; Altitudinal belt: Boreal;

Bol 1. Region: Trentino-Alto Adige; Province: Bolzano; Locality: Selva Verde, Valle del Renon; UTM coordinates: UTM 32 T 112604 463516; Altitude (m): 1740 m; Slope and aspect: 35° SW; Precipitation (mm): 970; Average yearly temperature (C°): 4; Biocoenosis: *Picea abies*; Vegetational association: *Polysticho-Fagetum*; Bioclimatic zone: Medium-European; Altitudinal belt: Boreal;

Fri 2. Region: Friuli-Venezia Giulia; Province: Udine; Locality: Tarvisio, Rutte, Foresta Demaniale del Tarvisio; UTM coordinates: UTM 33 T 392046 5149576; Altitude (m): 820 m; Slope and aspect: 10° NW; Precipitation (mm): 1500; Average yearly temperature (C°): 6; Biocoenosis: high forest – *Picea abies*; Vegetational association: *Veronico urticifoliae-Piceetum*; Bioclimatic zone: Medium-European; Altitudinal belt: sub-Atlantic;

Tos 1. Region: Tuscany; Province: Livorno; Locality: Colognole; UTM coordinates: UTM 32 T 616286 4818395; Altitude (m): 150 m; Slope and aspect: 10° N; Precipitation (mm): 900; Average yearly temperature (C°): 15; Biocoenosis: Old coppice – *Quercus ilex*; Vegetational association: *Orno-Quercetum ilicis*; Bioclimatic zone: Mediterranean; Altitudinal belt: Mediterranean;

Tos 2. Region: Tuscany; Province: Grosseto; Locality: Cala Violina, Scarlino; UTM coordinates: UTM 32 T 645074 4747908; Altitude (m): 300 m; Slope and aspect: 5° WNW; Precipitation (mm): 650; Average yearly temperature (C°): 15; Biocoenosis: Old coppice – *Quercus ilex*, *Fraxinus ornus*; Vegetational association: *Viburnum* – *Quercetum ilicis*; Bioclimatic zone: Mediterranean; Altitudinal belt: Mediterranean;

Laz 2. Region: Latium; Province: Latina; Locality: San Felice Circeo, Peretto; UTM coordinates: UTM 33 T 339878 4566581; Altitude (m): 190 m; Slope and aspect: 10°–20° NNW; Precipitation (mm): 900; Average yearly temperature (C°): 15,5; Biocoenosis: Old coppice – *Quercus ilex* forest; Vegetational association: *Orno-Quercetum ilicis*; Bioclimatic zone: Mediterranean; Altitudinal belt: Mediterranean;

Abr 1. Region: Abruzzo; Province: L'Aquila; Locality: Collelongo, Selva Piana, Serra Lunga; UTM coordinates: UTM 33 T 133523 415051; Altitude (m): 1500 m; Slope and aspect: 5°–10° S; Precipitation (mm): 1300; Average yearly temperature (C°): 10; Biocoenosis: high forest – *Fagus sylvatica*, Vegetational association: *Polystichum-Fagetum*; Bioclimatic zone: Mediterranean; Altitudinal belt: sub-Atlantic;

Abr 2. Region: Abruzzo; Province: Chieti; Locality: Rosello, Abetina di Rosello; UTM coordinates: UTM 33 T 446086 4639155; Altitude (m): 960 m; Slope and aspect: 10° NNE; Precipitation (mm): 1000; Average yearly temperature (C°): 8.5; Biocoenosis: high forest – *Quercus cerris*, *Abies alba* and *Carpinus betulus* forest, Vegetational association: *Abietetosum albae*; Bioclimatic zone: Mediterranean; Altitudinal belt: sub-Atlantic;

Cal 1. Region: Calabria; Province: Reggio Calabria; Locality: Giffone, Piano Limina; UTM coordinates: UTM 33 S 602974 4253876; Altitude (m): 1100 m; Slope and aspect: 20° NE; Precipitation (mm): 1500; Average yearly temperature (C°): 10; Biocoenosis: *Fagus sylvatica* forest, Vegetational association: *Aquifolium-Fagetum*; Bioclimatic zone: Mediterranean; Altitudinal belt: sub-Atlantic;

Sar 1. Region: Sardinia; Province: Cagliari; Locality: Iglesias Marganai; UTM coordinates: UTM 32 S 462853 4355582; Altitude (m): 700 m; Slope and aspect: 5° S; Precipitation (mm): 900; Average yearly temperature (C°): 14; Biocoenosis: Old coppice – *Quercus ilex* forest; Vegetational association: *Viburnum* – *Quercetum ilicis*; Bioclimatic zone: Mediterranean; Altitudinal belt: Mediterranean;

Sar-C85. Region: Sardinia; Province: Cagliari; Locality: Iglesias, M.ti Marganai, Tintillonis; UTM coordinates: UTM 32 S 462590 4355061 Altitude (m): 480;

Sic 1. Region: Sicily; Province: Palermo; Locality: Bosco della Ficuzza, Torretta Torre; UTM coordinates: UTM 33 S 357671 4194110; Altitude (m): 940 m; Slope and aspect: 20° NNE; Precipitation (mm): 800; Average yearly temperature (C°): 13; Biocoenosis: Old coppice – *Quercus cerris* forest, Vegetational association: *Quercetum gussonei*; Bioclimatic zone: Mediterranean; Altitudinal belt: Mediterranean.